

AMENDMENT

Please replace all prior versions and listings of claims with the following listing of claims.

LISTING OF CLAIMS:

1. (Currently Amended) A mobile system responsive to a user generated natural language speech utterance, comprising:

a speech unit connected to a computer device on a vehicle, wherein the speech unit ~~receives~~ is configured to receive a natural language speech utterance from a user and ~~converts~~ convert the received natural language speech utterance into an electronic signal; and

a natural language speech processing system connected to the computer device on the vehicle, wherein the natural language speech processing system ~~is configured to receive~~ receives, ~~process~~ processes, and ~~respond~~ responds to the electronic signal using data received from a plurality of domain agents, wherein the natural language speech processing system includes:

a speech recognition engine ~~that recognizes~~ configured to recognize at least one of words or phrases from the electronic signal using at least the data received from the plurality of domain agents, wherein the data used by the speech recognition engine includes a plurality of dictionary and phrase entries that are dynamically updated based on at least a history of a current dialog and one or more prior dialogs associated with the user;

a parser ~~that interprets~~ configured to interpret the recognized words or phrases, wherein the parser uses at least the data received from the plurality of domain agents to interpret the recognized words or phrases, wherein the parser interprets ~~is configured to interpret~~ the recognized words or phrases by:

determining a context for the natural language speech utterance;

selecting at least one of the plurality of domain agents based on the determined context; and

transforming the recognized words or phrases into at least one of a question or a command, wherein the at least one question or command is

formulated in a grammar that the selected domain agent uses to process the formulated question or command; and

an agent architecture that configured to communicatively ~~couple~~ couples services of each of an agent manager, a system agent, the plurality of domain agents, and an agent library that includes one or more utilities that can be used by the system agent and the plurality of domain agents, wherein the selected domain agent uses is ~~configured to use~~ the communicatively coupled services to create a response to the formulated question or command and format the response for presentation to the user.

2. (Currently Amended) The mobile system according to claim 1, wherein the natural language speech processing system further includes an event manager ~~configured to that:~~

sends send and receives receive events to a plurality of components of the natural language speech processing system to coordinate interaction among the plurality of components of the natural language speech processing system; and

provides provide a multi-threaded environment that enables ~~configured to enable~~ the natural language speech processing system to provide a plurality of real-time responses to a plurality of questions or commands in a plurality of different contexts across a plurality of overlapping or interleaved sessions with the user.

3. (Cancelled)

4. (Currently Amended) The mobile system according to claim 1, wherein the response includes a text string and the natural language speech processing system further includes a text to speech engine that creates ~~configured to create~~ an encoded speech message to be annunciated to the user.

5. (Cancelled)

6. (Previously Presented) The mobile system according to claim 1, wherein the selected domain agent includes data associated with at least one of driving directions, travel information, restaurant information, systems information for the vehicle, safety information, or entertainment information.

7. (Previously Presented) The mobile system according to claim 1, wherein the selected domain agent includes data for communicating with one or more devices.

8. (Previously Presented) The mobile system according to claim 7, wherein the data for communicating with the one or more devices includes data for controlling the one or more devices.

9. (Cancelled)

10. (Previously Presented) The mobile system according to claim 7, wherein at least one of the one or more devices is connected to the vehicle.

11. (Previously Presented) The mobile system according to claim 10, wherein at least one of the speech unit or the natural language speech processing system is located remotely from the vehicle and connected to the computer device on the vehicle through a communication link.

12. (Previously Presented) The mobile system according to claim 10, wherein the at least one device connected to the vehicle includes at least one of a navigation system, a monitoring system, a security system, a control system, or a media system connected to the vehicle.

13. **(Previously Presented)** The mobile system according to claim 1, wherein the communicatively coupled services include at least one remotely located service and the selected domain agent includes data for controlling or communicating with the remotely located service.

14. **(Previously Presented)** The mobile system according to claim 13, wherein the remotely located service includes at least one of a payment service provider, a customer relationship management system, a specialized service, a location service, or an emergency service.

15. **(Currently Amended)** The mobile system according to claim 13, wherein the speech unit and the natural language speech processing system each include respective transceivers that ~~configured to~~ communicate via a communication network.

16. **(Original)** The mobile system according to claim 15, wherein the communication network is a wide area wireless network.

17. **(Previously Presented)** The mobile system according to claim 15, wherein the transceiver is a wide-area RF transceiver.

18. **(Currently Amended)** The mobile system according to claim 1, wherein the speech unit includes a speech coder that converts ~~configured to convert~~ the natural language speech utterance into the electronic signal, an array microphone that receives ~~configured to receive~~ the natural language speech utterance, and a filter that optimizes ~~configured to optimize~~ a signal to noise ratio of the electronic signal.

19. **(Currently Amended)** The mobile system according to claim 18, wherein the filter employs ~~is configured to employ~~ adaptive echo cancellation to optimize the signal to noise ratio of the electronic signal.

20. **(Original)** The mobile system according to claim 18, wherein the array microphone is at least a one-dimensional array.

21. **(Currently Amended)** The mobile system according to claim 18, wherein the speech coder uses ~~is configured to use~~ an adaptive lossy audio compression to convert the natural language utterance into the electronic signal.

22. **(Previously Presented)** The mobile system according to claim 1, wherein the speech unit is located remotely from the natural language speech processing system.

23. **(Previously Presented)** The mobile system according to claim 1, further comprising at least one of a display or a keypad.

24. **(Currently Amended)** The mobile system according to claim 10, further comprising a telematics control unit that interfaces ~~configured to interface~~ with the at least one device connected to the vehicle.

25. **(Previously Presented)** The mobile system according to claim 24, wherein at least one of the speech unit or the natural language speech processing system is embedded in the telematics control unit.

26. **(Previously Presented)** The mobile system according to claim 1, wherein at least one of the speech unit or the natural language speech processing system is embedded in at least one of the vehicle, a handheld device connected to the vehicle, a fixed computer device connected to the vehicle, or a mobile computer device connected to the vehicle.

27. **(Previously Presented)** The mobile system according to claim 1, wherein the communicatively coupled services include at least one shared network resource.

28. **(Currently Amended)** A method responsive to a user generated natural language speech utterance, comprising:

receiving, at a speech unit connected to a computer device on a vehicle, a natural language speech utterance from a user, wherein the speech unit converts ~~is configured to convert~~ the received natural language speech utterance into an electronic signal;

recognizing, at a speech recognition engine connected to the computer device on the vehicle, at least one of words or phrases from the electronic signal, wherein the speech recognition engine uses ~~is configured to use~~ at least data received from a plurality of domain agents to recognize the words or phrases, wherein the data used by the speech recognition engine includes a plurality of dictionary and phrase entries that are dynamically updated based on at least a history of a current dialog and one or more prior dialogs associated with the user;

determining, at a parser connected to the computer device on the vehicle, a context for the natural language speech utterance;

selecting, at the parser connected to the computer device on the vehicle, at least one of the plurality of domain agents based on the determined context;

transforming, at the parser connected to the computer device on the vehicle, the recognized words or phrases into at least one of a question or a command, wherein the at least one question or command is formulated in a grammar that the selected domain agent uses to process the formulated question or command; and

forwarding the formulated question or command to an agent architecture connected to the computer device on the vehicle, wherein the agent architecture ~~is configured to communicatively couple~~ couples services of each of an agent manager, a system agent, the plurality of domain agents, and an agent library that includes one or more utilities that can be used by the system agent and the plurality of domain agents, wherein the selected domain agent uses ~~is configured to use~~ the communicatively coupled services to create a response to the formulated question or command and format the response for presentation to the user.

29. **(Currently Amended)** The method according to claim 28, wherein the speech unit includes an array microphone that receives ~~configured to receive~~ the natural language speech utterance, a speech coder that converts ~~configured to convert~~ the natural language speech utterance into the electronic signal, and a filter that optimizes ~~configured to optimize~~ a signal to noise ratio of the electronic signal.

30. **(Previously Presented)** The method according to claim 28, the wherein the selected domain agent includes data for controlling or communicating with at least one of a navigation system, a monitoring system, a security system, a control system, or a media system connected to the vehicle.

31. **(Previously Presented)** The method according to claim 28, wherein the selected domain agent includes data associated with at least one of driving directions, travel information, restaurant information, systems information for the vehicle, safety information, or entertainment information.

32. **(Previously Presented)** The method according to claim 28, wherein the communicatively coupled services include at least one remotely located service and the selected domain agent includes data for controlling or communicating with the remotely located service.

33. **(Previously Presented)** The method according to claim 32, wherein forwarding the formulated question or command to the agent architecture includes transmitting a request to the remotely located service.

34. **(Previously Presented)** The method according to claim 33, wherein the remotely located service is associated with a remotely located device.

35. **(Previously Presented)** The method according to claim 33, wherein the request is transmitted to the remotely located service via a communication network.

36. **(Previously Presented)** The method according to claim 32, wherein the remotely located service includes at least one of a payment service provider, a customer relationship management system, a specialized service, a location service, or an emergency service.

37. **(Previously Presented)** The method according to 33, wherein the request is transmitted to the remotely located service via a wide-area RF transceiver.

38. **(Currently Amended)** The method according to 29, wherein the filter removes ~~is configured to remove~~ background noise from the electronic signal to optimize the signal to noise ratio of the electronic signal.

39. **(Currently Amended)** The method according to 29, wherein the filter employs ~~is configured to employ~~ at least one of adaptive echo cancellation or adaptive lossy audio compression to optimize the signal to noise ratio of the electronic signal.

40. **(Cancelled)**

41. **(Previously Presented)** The method according to claim 28, wherein the communicatively coupled services include one or more shared network resources.

42. **(Currently Amended)** The method according to claim 41, wherein the shared network resources include a telematics control unit that interfaces ~~configured to interface~~ with one or more devices connected to the vehicle.

43. **(Previously Presented)** The method according to claim 42, wherein the shared network resources further include at least one resource located remotely from the vehicle.

44-56. (Cancelled)

57. (Currently Amended) The mobile system according to claim 1, wherein the agent manager ~~is configured to:~~

loads ~~load~~ and initializes ~~initialize~~ the system agent and the plurality of domain agents in response to ~~when~~ the natural language speech processing system ~~boots-up~~ booting up;

unloads ~~unload~~ the system agent and the plurality of domain agents ~~when~~ in response to the natural language speech processing system ~~shuts-down~~ shutting down;

performs ~~perform~~ license management for the plurality of domain agents and content stored in one or more databases; and

searches ~~search~~ a network to find a source for a suitable agent ~~[[if]]~~ in response to the question or command requiring ~~requires~~ an agent not currently loaded on the natural language speech processing system.

58. (Previously Presented) The mobile system according to claim 1, wherein the one or more utilities included in the agent library include at least one of a text and string handling function, a network communications function, a database lookup and management function, a fuzzy and probabilistic evaluation function, or a text to speech formatting function.

59. **(Currently Amended)** The mobile system according to claim 58, wherein the system agent ~~is configured to:~~

provides ~~provide~~ default functionality and foundation services that can be used by each of the plurality of domain agents;

uses ~~use~~ one or more of the utilities included in the agent library to perform one or more of the [[the]] text and string handling function, the network communications function, the database lookup and management function, the fuzzy and probabilistic evaluation function, or the text to speech formatting function; and

manages ~~manage~~ one or more criteria handlers used to determine the context for the natural language speech utterance, wherein the one or more criteria handlers provide context sensitive procedures for extracting information from the at least one question or command.

60. **(Currently Amended)** The mobile system according to claim 1, wherein the speech recognition engine ~~is configured to:~~

determines ~~determine~~ an identity of the user based on unique voice characteristics of the user; and

tags ~~tag~~ the recognized words or phrases with the identity of the user to associate the utterance with the user and the current dialog in the natural language speech processing system.

61. **(Previously Presented)** The mobile system according to claim 1, wherein the plurality of dictionary and phrase entries used by the speech recognition engine are further dynamically updated based on one or more dynamic fuzzy set possibilities or prior probabilities derived from the history of the current dialog and the one or more prior dialogs.

62. **(Currently Amended)** The mobile system according to claim 2, wherein the multi-threaded environment of the event manager ~~is configured to further~~ enables enable the natural language speech processing system to use a plurality of the domain agents to provide the plurality of real-time responses to the plurality of questions or commands in the plurality of different contexts across the plurality of overlapping or interleaved sessions with the user.

63. **(Previously Presented)** The method according to claim 28, further comprising:
executing the question or command in response to determining that the question or command will not create a hazardous condition for the vehicle;
providing interactive guidance to the user to resolve the hazardous condition during the current dialog in response to determining that the question or command will create a hazardous condition for the vehicle; and
enabling the user to manually override the hazardous condition, wherein the question or command is executed in response to the user manually overriding the hazardous condition.

64. **(Previously Presented)** The method according to claim 28, further comprising:
receiving diagnostic information from one or more sensors connected to the vehicle, wherein the diagnostic information relates to one or more problems with the vehicle;
providing one or more interactive announcements or warnings to the user in response to the diagnostic information received from the one or more sensors; and
mediating a solution to the one or more problems with the vehicle during the current dialog with the user.

65. **(Previously Presented)** The method according to claim 64, wherein the solution to the one or more problems includes at least one of scheduling service for the vehicle, summoning help to the vehicle over one or more communication links, providing remedial instructions that address one or more of the problems, ordering one or more parts for the vehicle, or providing a cost estimate for the scheduled service.

66. **(Previously Presented)** The method according to claim 28, further comprising:
detecting an accident situation in response to information received from one or more sensors connected to the vehicle;
interacting with the user to determine at least one of a nature of the accident situation or a condition of the user; and
reporting the accident situation to emergency personnel over a communications link.
67. **(Previously Presented)** The method according to claim 66, wherein reporting the accident situation includes:
reporting at least one of the nature of the accident situation or the condition of the user to the emergency personnel; and
establishing a voice channel to enable communication between the user and the emergency personnel.
68. **(Previously Presented)** The method according to claim 28, further comprising:
determining that the recognized words or phrases include at least one predetermined panic or emergency words or phrases indicating that a crime is occurring; and
summoning help to the vehicle over one or more communication links in response to the recognized words or phrases including the at least one predetermined panic or emergency words or phrases indicating that the crime is occurring.
69. **(Previously Presented)** The method according to claim 28, further comprising providing interactive guidance to assist the user in performing one or more maneuvers to operate the vehicle.

70. **(Previously Presented)** The method according to claim 28, further comprising:
providing interactive routing information to coordinate a rendezvous with one or more other vehicles in communication with the vehicle; and
establishing a voice channel to enable communication between the user and one or more users in the one or more other vehicles.
71. **(Previously Presented)** The method according to claim 28, further comprising:
detecting that the vehicle is approaching or has exceeded a travel limit for the vehicle;
providing interactive guidance for returning to the travel limit or for not exceeding the travel limit; and
mediating a negotiation with the user to extend the travel limit.
72. **(Previously Presented)** The method according to claim 28, further comprising providing interactive guidance to relating to one or more tasks for the user based on a location of the vehicle.